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REPORT

TO THE

MONTANA LIVESTOCK SANITARY BOARD

DECEMBER 1, 1948 TO NOVEMBER 30, 1950

including totals for

BIENNIUM DECEMBER 1, 1948 -- NOVEMBER 30, 1950

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DECEMBER 1, 1949 TO NOVEMBER 30, 1950

including totals for

BIENNIUM DECEMBER 1, 1948 -- NOVEMBER 30, 1950

Helena, Montana
December 1, 1950

Honorable John W. Bonner
Governor of Montana
Helena, Montana

Dear Governor Bonner:

In compliance with Title 46, Section 242, Revised Codes of Montana, 1947, we transmit herewith the report of the State Veterinary Surgeon to the Montana Livestock Sanitary Board for the year December 1, 1949 to November 30, 1950, with appended totals for the previous year, December 1, 1948 to November 30, 1949, for comparison.

Respectfully submitted,

MONTANA LIVESTOCK SANITARY BOARD,

H. F. WILKINS, D.V.M.
Secretary and Executive Officer

HFW:td

MONTANA LIVESTOCK SANITARY BOARD

* * * * *

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* * * * *

H. F. WILKINS, D.V.M.
Secretary and Executive Officer
State Veterinary Surgeon
Director of Laboratories

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REPORT TO THE

MONTANA LIVESTOCK SANITARY BOARD

Helena, Montana
Dec. 1, 1950

Honorable Livestock Sanitary Board
Helena, Montana

Gentlemen:

In compliance with Title 46, Section 242, Revised Codes of Montana, 1947, we submit the report of the State Veterinary Surgeon and Executive Officer of the Montana Livestock Sanitary Board for the year December 1, 1949 to November 30, 1950, with totals appended hereto for the previous year, December 1, 1948 to November 30, 1949, for comparison.

There were five meetings of the Montana Livestock Sanitary Board held during the year 1950:

The first meeting was held at Helena on December 9, 1949.
The second and Annual Meeting was held at Helena on Mar. 6, 1950.
The third meeting was held at Billings on May 25 and 26, 1950.
The fourth meeting was held at Helena on July 24, 1950.
The fifth meeting was held at Billings on November 29, 1950.

At these various meetings, matters pertaining to the duties of the Montana Livestock Sanitary Board and of interest to the livestock industry were discussed at length and acted upon.

All actions, regulations and orders promulgated by the Executive Officer during the interim of the various meetings, were approved.

The complete minutes of all meetings are on file in the office of the Secretary, at the Livestock Building in Helena, Montana.

F O R E W O R D

The success of any livestock or poultry operation is, to a great extent, dependent upon freedom from disease. If every livestock operator realized the importance of disease control and eradication to his success and well-being, he would give better cooperation. In Montana, our livestock operators have given us excellent support and cooperation, with the result that our disease-control programs have been carried out in a most successful manner. In a few instances cooperation was slow in coming, with the result that prompt control and speedy eradication were delayed longer than necessary.

Due to our constructive control programs, our livestock and poultry are not riddled with disease, as is the case in many countries, so, with reasonable cooperation, we can hold the line and continue to push back most any disease, as we have done with tuberculosis, scabies, pullorum disease and many others. We want our livestock and poultry operators and all allied interests to know that the Montana Livestock Sanitary Board is trying its utmost to assist in eliminating destructive diseases. Any

disease-control program must be sound and should be thoroughly understood by the livestock operator. He is the primary beneficiary, and it is his responsibility to see to it that tests and inspections are made as required so as to speedily effect proper control and ultimate eradication of disease. Most programs are carried on in cooperation with other interested departments and organizations. In the brucellosis-control program we work closely with the Extension Service, the U. S. Bureau of Animal Industry, the Veterinary Research Laboratory, saleyard operators, stock growers, health departments, 4-H Clubs and others.

It is heartening at times and distressing at others to note the ups and downs in our livestock industry which are so keenly affected by the weather, feed supplies and their quality, markets, diseases and threats of diseases. During the past year we suffered through a long, hard winter and a late, cold spring. When we were about to sell out (a few did) and turn the country back to the Indians and grasshoppers, conditions suddenly changed for the better. We were again blessed with an abundance of rain, which continued throughout the summer. This resulted in one of the best years on record for grass and feed production.

This fall all classes of livestock are entering the winter in better than normal condition, and the feed supply appears ample to carry us through a moderately severe winter and late spring. The demand for all classes of livestock has been strong and prices have been satisfactory. We have had about average losses due to common infectious and parasitic diseases, but have not been visited by any new or devastating plagues. Some think this cannot happen to us, however, unless we are prepared to act quickly and effectively, heavy losses could ruin our economy and our livestock industry in Montana.

Good management is an all-important factor in the success of any livestock operation. By having a good knowledge of the most common, preventable diseases -- nutritional, infectious and parasitic -- a rancher can prevent many losses. Conditions such as rickets, premature or weak calves due to nutritional deficiencies, brucellosis, blackleg, shipping fever, coccidiosis, lice and many others can be prevented by proper handling, feeding, watering, vaccinating, dipping or spraying, or by specific and timely medication. Some preventive measures must be applied years in advance of probable loss, as in the case of nutritional deficiencies or such diseases as brucellosis. Brucellosis is a very costly disease but one which can, in a large measure, be prevented and controlled by vaccination. The addition to herds of only brucellosis-free cattle, and by the application of all practices, recognized by competent authorities as effective for its control and eradication, are essential for ultimate success.

Not knowing how long or how hard the winter will be, it is recommended that herds be carefully culled and that all old, poor-quality, hard-keeping animals be sold, as well as all diseased animals. Known brucellosis reactors, cancer-eye cattle, those with actinomycosis, or lumpy jaw, and those which have been affected with a disease which might recur are an unnecessary risk. The market is good, and why should any stockman spend time and money and suffer the inevitable mental distress to salvage some animal which may be worth more right now than at any time in the future? The time, feed, money and effort expended in attempting to salvage some poor animal which should have been sold, if spent on a good-quality animal, would, under ordinary conditions, produce handsome dividends.

It is doubtful if we have ever in the history of Montana carried such a valuable livestock and poultry inventory; even though in numbers each species has been recorded higher. As of January 1, 1950; Government statistics indicated we had 153,000 horses, 1,000 mules, 1,731,000 cattle, 1,735,000 sheep, 192,000 hogs, 2,054,000 chickens and 15,000 turkeys; or 5,881,000 units of livestock and poultry. The statistical value of this livestock and poultry is $226,978,000, which is 18% below the January 1, 1949 value of $325,224,000. These figures as of January 1 do not portend a true picture of the year-round livestock and poultry population, as they cannot indicate the normal increase in numbers or the increase in value during the year. When these facts are taken into consideration, the average livestock population of Montana throughout the year is materially larger than is generally believed, and the average total yearly value is likewise increased. It is apparent at this time, that the 1951 inventory will equal or exceed that of 1949 or 1950 and that there is every indication that there will be a marked increase in the number of sheep in 1951. It may be conservatively estimated that we carry a livestock population of from six to six and one-half million animals and between five and six million chickens and turkeys throughout the greater part of the year.

The cash receipts in 1949 from livestock and poultry operations were, as follows:

Cattle and calves	$124,183,000	
Dairy products	16,467,000	
	$140,650,000	$140,650,000
Sheep and lambs	20,514,000	
Wool	8,005,000	
	$ 28,514,000	28,514,000
Hogs	$ 10,441,000	10,441,000
Eggs	6,062,000	
Chickens	2,306,000	
Turkeys	714,000	
	$ 9,082,000	9,082,000
Other livestock, including horses	$ 904,000	904,000
Total		$189,591,000

The Montana Livestock Sanitary Board receives less than $1.00 for each $2,500.00 worth of livestock and poultry for the following services:

To control and eradicate the diseases which we now have
To prevent the introduction of new diseases and plagues and to control and eradicate them should they be introduced
To operate a chemical laboratory
To operate a bacteriological and pathological laboratory
To pay indemnity for animals or poultry ordered destroyed by the Montana Livestock Sanitary Board which have been found affected with tuberculosis or other diseases.
To pay half the salaries of two scientists at the Veterinary Research Laboratory at Bozeman

To inspect and supervise the operation of public saleyards
To inspect slaughterhouses
To inspect rendering plants
To supervise state meat inspection
To inspect and supervise the operation of all dairies selling milk and cream for consumption as such
To inspect and supervise the operation of all milk plants
To prepare educational publications
To attend various livestock and public health meetings, both local and national
To protect the public from transmissible animal diseases by milk and meat inspection and other means
And, in general, to protect a perishable product (livestock and poultry) conservatively estimated at 11,000,000 units during most months of the year and valued at from five hundred to six hundred million dollars.

It is estimated that 40¢ of each dollar spent is for services directly bearing on public health.

To perform the numerous functions outlined, there are about fifty veterinarians in Montana, engaged in private practice or employed by the State or the United States Bureau of Animal Industry, on whom we can depend to protect the individual and collective health of our multimillion dollar livestock and poultry population and to assure our people of a satisfactory and adequate milk and meat supply. Our veterinary personnel is entirely inadequate, and every veterinarian now in Montana should be retained here for the protection of our livestock and poultry, for public health reasons, and as an added safeguard against the introduction of devastating animal plagues. Most states with less livestock population and much smaller areas have hundreds of veterinarians, and some states have several thousand. Due to general increases in cost of operation, it has been necessary for the Montana Livestock Sanitary Board to ask for an increase in appropriation, which it is hoped will be favorably considered by the legislature.

FINANCES

Our report gives a fairly accurate picture of work performed, but we know there is a lot of work done which cannot be adequately accounted for in a report.

We are living in the most dangerous age in our history and at a time when we must be on the alert and prepared for any emergency at a moment's notice. The Montana Livestock Sanitary Board is proud of its accomplishments in disease control and public health work. It fully realizes its responsibilities and obligations, not only to the livestock industry, but to all the people of Montana, and stands ready day or night at all times during the year to afford protection against the introduction of devastating plagues.

The Montana Livestock Sanitary Board has additional responsibilities conferred upon it at practically every session of the legislature, but seldom has it received an increase in appropriation commensurate with the added duties and increase in operating expense. Due to the amount of work

we are obliged to perform and to the mounting costs of operation, we are obliged to ask for an increased appropriation. It is hoped our legislators will study our report and give favorable consideration to our budget request.

VETERINARY RESEARCH LABORATORY
Report for 1949-1950

Since the Veterinary Research Laboratory is an integral part of the Montana Livestock Sanitary Board with a very close and harmonious working relationship and the fact that two of the Laboratory's scientific staff are partly financed by the Board, it seems proper to record several changes made at the Laboratory during the year.

Dr. Hadleigh Marsh voluntarily retired from the active administrative responsibilities after twenty years of organization and service as Director of the Laboratory to devote his entire time to research and writing. On July 1, Dr. E. A. Tunnicliff, for the past twenty years having served as Veterinary Pathologist, took over the administration of the Laboratory.

The scientific staff consists of the following veterinarians: H. Marsh, Lee Seghetti, H. Welch, and E. A. Tunnicliff; K. Swingle the biochemist; and Louis DS Smith and Burton Firehammer the bacteriologists. The nutritional and pathological work is headed by Marsh; parasitiological investigations by Seghetti; histological preparations by Firehammer; virus work by Tunnicliff; chemical analyses by Swingle, and anaerobic bacteriological studies by Smith. Dr. Marsh, the consulting bacteriologist and pathologist, and Dr. Smith, who joined the staff September 1, as bacteriologist in charge of red-water studies, are the two part-time Board employees.

Construction on the new Veterinary Research Laboratory has been delayed due to the controversy over the bond issue from which it was to be financed. However, a very comprehensive program of re-equiping and refurnishing the present building, and the adjacent corrals, fences, and sheds is nearing completion. New sheep and cattle corrals, chutes and sorting pens, a lambing and shearing shed, a storage quonset, 2 infectious-disease buildings, one for sheep and another for cattle diseases, have been completed and are now in use. The new $22,282 autopsy and incinerator building of the latest design should be completed early next year. These new facilities will now enable the safe and efficient handling of any type of infectious disease material.

LITIGATION

Complaints were filed against two saleyards in 1949 for non-compliance with the provisions of Regulation 36. One license was suspended from December 1, 1949 to July 1950, at which time a new yard was completed. This yard is reputed to be one of the finest small yards in the west.

The Miles City Auction is still operating in violation of Regulation 36. The District Court upheld the decision of the Montana Livestock Commission in which they ruled their license be cancelled and operations be suspended until a new yard had been completed. Following this action by the District Court, the defendants have asked for a Supreme Court

decision which may permit them to continue to operate for several months more in their present location. A new yard is now under construction and should be ready for use by early summer of 1951.

A number of degrading orders were issued to dairymen who failed to comply with Regulation I, however, it was not necessary in any instance to take court action. We are pleased to report there were no cases taken to the District Court and that we have been successful in obtaining compliance without legal action.

H O R S E S

GLANDERS AND DOURINE

There has not been a single case of glanders diagnosed in Montana since 1930, nor a case of dourine since 1929, so we are confident that these diseases have been eradicated from horses in Montana and will not refer to them in the future unless diagnosed.

DISTEMPER

Distemper in horses has been mild with but few cases reported. However, one horseman reported a most malignant outbreak with some deaths following the introduction of a few southern horses, which contracted the disease enroute to Montana. Had these imported horses been isolated from all others, as all imported animals should be for a time, these losses could have been prevented.

ENCEPHALOMYELITIS

There were 35 cases of encephalomyelitis officially reported in Montana in 1949 and 9 cases in 1950. However, from unofficial reports we know there were more. Most cases were mild, but we had enough to make us aware of its existence and of the assurance that it will again strike hard at some time in the future as it did in 1938.

It is recommended that valuable horses be vaccinated prior to the time when the disease usually appears each year, which in Montana is some time during July.

INFECTIOUS ANEMIA

Infectious anemia in horses continues to exist in Montana, but for a number of years has been of little importance. Horses may be infected and be carriers of infectious anemia virus throughout their lives and be disseminators of the disease to susceptible animals without themselves showing any outward indication of the disease. Five cases were diagnosed on one ranch during 1949, but no cases were reported in 1950.

C A T T L E

TUBERCULOSIS

Tuberculosis continues to exist in the United States and is definitely on the increase in some states due to the apathy of livestockmen

who seem to think it has been eradicated and who do not give sanitary officials proper cooperation. Granted it has been greatly reduced, and in some states eradicated for all practical purposes, it MUST be remembered that a few cases do exist in most states and in some it seems to have increased and in some instances its spread is causing alarm.

Practically all cows from which milk is sold for human consumption and a few cattle from many of the purebred and ranch herds are tested annually. Too many years have passed since all purebred herds have been tested in their entirety so an effort is now being made to tuberculin test these herds as fast as time and opportunity permit. These tests will give us a good overall picture of the disease in Montana and act as an added safeguard to the cattle industry.

During the year 1950, in cooperation with the Bureau of Animal Industry, United States Department of Agriculture, 19,959 cattle were tested for tuberculosis. Of this number, 5 reacted and 1 showed lesions indicative of tuberculosis on post mortem examination, as compared with 19,161 cattle tested and 6 reacted of which 1 showed lesions, during the previous year 1949. Only 1 case of tuberculosis was found in cattle slaughtered in packing plants operating under Federal inspection and none in plants where State inspection is maintained. Whenever lesions, indicative of tuberculosis, are found, it is required that the lesions be forwarded to the Montana Livestock Sanitary Board Laboratory for verification and typing. At times lesions are found which closely resemble those of tuberculosis but which fail to contain the organism responsible for bovine tuberculosis.

When tuberculosis is found, either by test or from reports received from packing houses, all cattle associated with the case are tested and retested until the disease has been completely eradicated from the herd or herds involved. By strictly adhering to this practice, we have been eminently successful in our tuberculosis control and eradication program as shown by this report.

From December 1, 1949, through October 31, 1950, a total of 22,840 cattle and 2,067 calves were slaughtered under Federal supervision, as compared to 28,700 cattle and 3,965 calves in plants in Montana where Federal inspection is maintained, during the preceding year. From Dec. 1, 1949 through Nov. 30, 1950 a total of 11,703 cattle and 2,253 calves were slaughtered under State supervision as compared to 10,630 cattle and 3,178 calves slaughtered in the preceding year. During the past 24 months no reports of tuberculosis have been received from Federal, state or municipal slaughterhouses in other states where Montana cattle have been slaughtered. This is very good evidence that tuberculosis in Montana cattle has been reduced to the point of almost non-existence. As previously reported, however, there is always a possibility that infection may be present in some herds and that infection may also be imported with cattle from other states. Therefore, continual vigilance is essential, and we must always put forth our best efforts to prevent the introduction of tuberculosis into the State and to ferret out and eradicate any centers of infection which may exist in Montana.

Montana continues to be classified as a modified accredited tuberculosis-free area.

BRUCELLOSIS

Brucellosis continues to hold first place among infectious diseases considered for eradication in the United States. It is a disease which can be satisfactorily controlled in most any herd or area and with proper cooperation can be eradicated within a relatively few years (two to four) with little loss to the owner. Because it can now be so satisfactorily controlled and eradicated and because of its important public health aspect, there is no good reason for its existence other than because of indifference or ignorance on the part of the livestock owner.

During 1950 a total of 49,711 cattle were tested for brucellosis. Of this number 45,161 were negative, 1,688 gave a positive reaction and 2,862 gave a suspicious reaction, as compared with a total of 45,719 cattle tested with 41,044 negative, 1,797 positive and 2,878 suspicious reactions in 1949. The laboratory tested 3 8,149 blood samples submitted by Federal and State veterinarians and 11,562 blood samples were tested in the field by deputy state veterinarians as compared to 33,856 blood samples submitted and 11,863 field tests made in 1949.

During 1950, a total of 3,255 dairy cattle were tested for sale at saleyards and for local auction sales. Of this number 3,012 were negative, 120 gave a positive reaction and 123 gave a suspicious reaction. Sixteen of the 120 reactors were recorded as vaccinated animals and 48 of the 123 suspects were recorded as having been vaccinated, as compared with 3,536 dairy cattle tested in saleyards with 3,239 negative, 126 positive and 171 suspicious reactions. Six of the 126 reactors were vaccinated animals and 62 of the 171 suspects had been vaccinated in 1949.

A total of 46,158 calves were officially vaccinated by Federal and State veterinarians during 1950 as compared with 34,046 during 1949.

There never has been any diversity of opinion among veterinarians in Montana regarding methods for the control and eradication of bovine brucellosis. We absolutely believe, and practical experience has proven, that bovine brucellosis can be eradicated from range and semi-range herds by good herd management alone. However, the process will be hastened by blood testing, where indicated, with elimination of reactors, and by vaccination and proper identification of replacement heifer calves. While no disease ever has been, or probably ever will be, completely eradicated by vaccination alone, we cannot overstress the importance of vaccination. In range and semi-range herds, we believe better results will be obtained if all heifer calves are vaccinated sometime between the ages of six and twelve months. In many instances an animal vaccinated when too immature simply does not develop sufficient immunity to prevent disease, especially if the animal is exposed to virulent mass infection. This applies not only to brucellosis but also to blackleg and many other diseases.

It is the recommendation of the United States Livestock Sanitary Association, as well as our recommendation, that dairy calves be vaccinated between the ages of six to eight months.

In the control of brucellosis it is well to remember that animals other than cattle may become infected and may be carriers. We know that horses may be carriers. Research has demonstrated that many horses affected with fistulous withers or poll evil are affected with brucellosis and that a number of so-called obscure outbreaks have been definitely traced to the introduction of diseased horses.

Swine are very susceptible to brucellosis, and the disease occurs in swine throughout the United States wherever hogs are raised. It is most common in the corn-hog-belt states in the Middle West. Swine brucellosis was detected on two premises in Montana during 1949, but none in 1950, and the disease apparently was completely eliminated in all instances.

Thirty-three goats were tested for brucellosis during the past 2 years, none of which gave suspicious reactions. Brucellosis in sheep never has been diagnosed in Montana.

The Montana Livestock Sanitary Board, as finances and personnel permit, will continue to institute a brucellosis testing and vaccination campaign in any disease-control area established in accordance with the provisions outlined in Title 46, Section 212, Revised Codes of Montana 1947. Such an area may be established upon receipt of a petition signed by not less than 75% of the livestock owners of the species of animals to be tested or vaccinated, and representing not less than 50% of such species in any township. When 75% or more of the townships in any county in Montana are established by the Montana Livestock Sanitary Board as a disease-control area, it becomes mandatory on the part of the remaining livestock owners in such county to submit their livestock for test or vaccination, as directed by the Montana Livestock Sanitary Board.

More than 75% of the livestock owners in more than 75% of the townships in Lake County have petitioned the Montana Livestock Sanitary Board to establish Lake County as a brucellosis control area. Official quarantine notices have been published and the county declared a brucellosis-control area effective October 1, 1950. A concerted effort is now being made to vaccinate all heifers in the county and to test all herds so that a constructive and applicable eradication program can be established in each herd in the county.

JOHNE'S DISEASE

There were five cases tested for Johne's disease, with 4 negative and 1 suspicious reactor in 1950, and no cases in 1949.

SCABIES

Only one case of scabies in cattle was reported during the biennium, and that in December 1949. This was a purebred Shorthorn cow shipped in from the State of Illinois. This cow and all exposed cattle were dipped under state supervision and the disease eradicated without spreading to other herds.

Many investigations have been made of suspected cases, all of which have proven to be skin conditions due to other causes. Practically all outbreaks of scabies in Montana have been traced to the importation of purebred cattle, especially bulls. Such animals were treated by the owners and at the time of purchase were clinically free from the disease, but after a lapse of several months, developed scabies so that it could be readily diagnosed by anyone familiar with this disease. Stockmen are therefore advised to segregate all new additions to their herds, especially imported purebred bulls for a period of at least three months, so that the disease may develop and be diagnosed and treated before an entire herd becomes exposed. Stockmen are also urged to report to the Montana Livestock Sanitary Board or to its nearest veterinarian any suspected cases of scabies or any other disease of an unusual nature.

ANTHRAX

There were no cases of anthrax diagnosed in Montana during 1949 or 1950.

ANAPLASMOSIS

Anaplasmosis was diagnosed in ten herds of cattle during the biennium. Twenty-three head were officially reported as clinically affected and positively identified as carrying the infection. This was determined by the identification of marginal bodies in blood smears or by positive complement-fixation tests or both. On one ranch it was authoratively reported by the owner that at least one hundred head died in 1948 and 35 in 1949. No report was made for 1950; however, it is surmised some losses occurred. Significant losses have also been observed or reported on other ranches in widely separated areas in the state.

Anaplasmosis has not been a serious problem in Montana, but is rapidly becoming one. It is prevalent in states to the south from which we import many cattle each year. Our stockmen are advised to be extremely careful about indiscriminately picking up replacement cattle without exercising every possible precaution to prevent the introduction of anaplasmosis into their herds.

This disease is transmitted through the medium of infected ticks, by infected, recovered carrier animals, through the medium of biting insects and by means of contaminated dehorners, needles and surgical instruments. On two ranches in question, where the disease has been observed in past years, the tick population was very high. Not only in Montana, but in many states where ticks are a problem, many cases of anaplasmosis can be attributed to them.

The Pathological Division of the Bureau of Animal Industry, United States Department of Agriculture, has perfected the complement-fixation test for the detection of anaplasmosis-infected animals. It is reported that this test is now approximately 90% to 95% efficient in detecting carrier animals. It should be used to detect infected cattle intended for interstate shipment from areas or infected herds where it is known or suspected to exist.

It may also be used to great advantage by our own stockmen for the detection of carrier animals in their herds. Carrier animals should be segregated and handled so that the disease will not be disseminated within their herds or to neighboring or other cattle.

Blood samples from a few herds, and from suspicious cases in isolated herds have been tested by the complement-fixation test during the biennium, however, most tests have been made during the first few months of 1950. For more details, check the report of the bacteriologist. One herd of 287 cattle was tested in which a few losses had occurred which disclosed three reactors and one suspect. The removal of these reactors (disease-carrier animals) could be the means of preventing many losses in subsequent years.

We have been asked to test about two thousand head of cattle which may have been exposed in herds in which a few deaths from anaplasmosis have occurred. The supply of antigen or test fluid, is prepared by the Bureau, and due to difficulties in its preparation, the supply

has been insufficient to permit us to test as many cattle as would be desirable, or for which requests have been made.

Control measures on ranches where anaplasmosis has been diagnosed, consist of testing of all cattle by the complement-fixation test, rodent control, dipping or spraying of animals for control and elimination of ticks and other insect carriers or transmitters of the disease, the sale as feeders or for slaughter of all reactors and recovered cases, and all animals which are thought to have had the disease, together with calves from recovered cows. Calves may have the disease in a very mild form but may be immune carriers and transmitters throughout their lives.

LIVESTOCK MEN SHOULD ALWAYS REPORT UNUSUAL LOSSES OF LIVESTOCK TO THEIR NEAREST VETERINARIAN SO THAT A POSITIVE DIAGNOSIS CAN, IF POSSIBLE, BE MADE.

BACILLARY ICTEROHEMOGLOBINURIA
(Red Water)

During 1950, 7,201 cattle were officially vaccinated against bacillary icterohemoglobinuria and 28 cases of the disease diagnosed as compared with 5,611 cattle vaccinated and 24 diagnosed in 1949. For a summary and outline of the disease we refer you to our previous reports. Six hundred and eleven blood samples were tested for bacillary icterohemoglobinuria of which 440 were negative, 83 positive, and 88 suspicious.

With the help of Dr. Louis DS Smith, our newly acquired anaerobic bacteriologist for the Veterinary Research Laboratory at Bozeman, we hope, in the future to purchase some of these reactors, for further study. We are particularly anxious to know if a reactor carries the infection, and if so, what is the exciting factor which causes it to flare up and produce disease in an animal which has been infected for months or years. We are quite sure we will have something of interest to report on this subject at a later date.

BLACK DISEASE

There were no cases of black disease diagnosed in Montana during 1949 or 1950.

LEPTOSPIROSIS

There were no cases of leptospirosis diagnosed in cattle in Montana in 1949 or 1950.

MALIGNANT CATARRH

There were two cases of malignant catarrh diagnosed in Montana in 1949 and only one case in 1950.

PULMONARY EMPHYSEMA

Thirty-three cases of pulmonary emphysema have been officially reported and many unofficial cases were called to our attention.

Personal communications indicate that this peculiar phenomenon continues to increase and to appear in areas and on ranches where it has not

previously been diagnosed. On many ranches where it appeared on previous occasions it was not diagnosed for a number of years. However, there are a few ranches which consistently have a number of cases of asthma each year.

This is one of the diseases which will require extensive research and the services of an especially well-trained veterinarian or bacteriologist to assist us in ultimately determining its cause. Pulmonary emphysema is, for the most part, a seasonal disease, occurring usually in from six to ten days in cattle which have been moved from dry ranges to cut-over meadow pastures in which there is usually some secondary growth. It occurs more frequently in cows with calves at side, but it may be observed in steers and bulls. More frequently it has been diagnosed in milk cows feeding on alfalfa hay during the spring and fall. It has also been observed in yearlings and reported in calves. It may easily be confused with pneumonia and other respiratory disorders.

It has been unofficially reported in sheep so we are anxious to have any sheep losses with symptoms of the disease promptly reported so that a positive diagnosis may be made.

Two methods of experimental treatment were used on some of the affected cows. On the asumption that pulmonary emphysema may be an allergy, 22 animals were treated by the intramuscular injection of 500--1,000 milligrams of pyribenzamine hydrochloride solution per 1,000 lbs. body weight two to three times a day. Two of these cases died during treatment, one died following treatment and 19 recovered in 48-72 hours. On the premise that the condition might be a type of enterotoxemia, approximately 25 animals were treated by drenching with one pound of Epsom salt. Five animals died during treatment and 20 survived. The laboratory was able to demonstrate Clostridium welchii, Type A toxin in duodenal washings from two cases of pulmonary emphysema during the year.

PODODERMATITIS

(Foul foot, Foot rot, etc.)

Three hundred and eight cases of pododermatitis have been officially reported to the Helena office and we are sure this constituted only a small percentage of the cases during the year. This is considered by many of our stockmen and veterinarians to be our most costly disease problem. It is hoped that increased facilities will soon be made available to the Veterinary Research Laboratory in Bozeman for detailed study of this disease with the view of determining its cause and satisfactory means for its prevention. Local treatment has not proved very effective but the intravenous administration of one of the sulfa drugs, preferably sodium sulfapyridine, sulfamethazine or sulfathiazole, has given excellent results when administered early. Where the drug may not be given intravenously, it may be given by bolus or in suspension by mouth.

TRANSPORTATION OR RAILROAD TETANY

A number of cases of transportation, or railroad tetany, were observed in cattle in 1949, particularly in cows which were shipped from other states and from drought areas in Montana where nutritional deficiencies have been common. Its incidence was less in 1950. This disease condition is characterized by unsteady gait, weakness, extreme nervousness, inclination to fight, champing of the jaws accompanied by an accumulation of foamy saliva. When the disease is recognized early and properly treated, a high percentage of the affected animals can be saved.

LOCO

Locoweed, which for the past 25 years, has caused no appreciable trouble, has again become evident on many ranges and we have received numerous reports of locoed animals, however, there were fewer reports during 1949 and 1950 than during the two or three years immediately preceding this report, probably due to exceedingly good grazing in the loco-infested areas. The re-appearance of this plant has no doubt been caused by the unusually high precipitation during the past ten years.

Since no satisfactory method for the control of this plant is known, stockmen will find it necessary to use caution in grazing land on which there is heavy growth of locoweed. Animals should never be grazed on land on which this plant is plentiful until there is an abundance of green grass. Since loco is habitforming, it is not advisable to graze animals, which have been locoed, on ranges where many of these plants exist. Animals should be carefully watched for symptoms of locoweed poisoning. Should this occur, they should be moved immediately to new and preferably green pastures. Treatment of animals affected by eating loco has not been successful as damage to the central nervous system is apparently permanent.

TOXAPHENE AND CHLORDANE POISONING

Five head of cattle are known to have died from toxaphene poisoning associated with grasshopper control programs in 1949, however, with better cooperation and care, no deaths were reported during the 1950 campaign. Toxaphene will produce no harmful effects when consumed in small amounts, such as animals may pick up in areas which have been poisoned according to the supervising authorities. The losses in question were due to negligence for which there was no legitimate excuse. In the future all poisoning programs will be carefully supervised with proper correlation of all interested agencies. It is hoped no livestock losses will be sustained following future poisoning programs.

The Montana Veterinary Research Laboratory conducted some tests at the College with these poisons and have the following to report:

> "Grasshopper baits prepared with bran and various toxaphene and chlordane levels were fed cattle to determine lethal doses, symptoms, pathology, and chemical content of different tissues from the fatal cases. The minimum toxic dose of toxaphene was 35 mg. per kilo, and the minimum fatal dose was 144 mg. per kilo of body weight. With chlordane the minimum toxic dose was 91 mg. per kilo, and the minimum fatal dose was 129 mg. per kilo."

UROLITHIASIS

(Urinary Calculi or Water Belly)

Urinary calculi, (Water Belly) is a very perplexing problem which is causing serious losses to the cattle industry in Montana and other western states. It is most commonly recognized in steer calves soon after weaning, older steers and bulls. Calculi are frequently observed in the kidneys and bladder of female animals, but seldom cause noticeable illness. Extensive losses have been reported in years past, in wethers and bucks in certain areas.

There are a number of factors known which contribute to this condition of which vitamin A is probably the one most commonly recognized. Steers fed a vitamin A deficient diet over a long period of time develop a high incidence of urinary calculi. Steers fed the same diet supplemented with vitamin A seldom develop the disease.

There is ample reason to believe that an inadequate amount of vitamin A (cod liver oil, green grass, green leafy hay, new yellow corn etc.) is in a large measure responsible for many cases of urinary calculi, especially in cattle in a feed lot and on a range where the feed is deficient or completely lacking in vitamin A for a period of several months.

That other factors are important is recognized by the fact that many steers develop urolithiasis which have had sufficient vitamin A, but which are otherwise receiving a deficient or unbalanced diet.

An insufficient intake of water is definitely an important factor and especially so in weaner calves.

We are more of the opinion each year that the condition in many instances is due to a mineral imbalance and that this is due in a great part to the methods under which we now operate. It is quite possible that in certain areas our stockmen feed the wrong mineral supplement or concentrate. We know, that in many areas, we have a mineral deficiency. In Montana, the mineral most commonly deficient is phosphorus. In most sections, we have an abundance of calcium. If we feed a mixture containing a high calcium content, we may be accentuating the mineral imbalance of some animals. Nature has provided most animals with the ability to take care of these mineral imbalances so that the excessive minerals are voided. However, this may not occur in all animals and in cases where excess minerals are not voided through the intestinal tract, the formation of urinary calculi may result.

Reports have been received in the office from stockmen who have had an abnormally high percentage of urinary calculi cases in steer calves but that during the years when they fed sodium acid phosphate in their salt mixture, using a mixture of 50% stock salt and up to 50% sodium phosphate, and one-half to one oz. of potassium iodide with each 100 lbs. of mixture, that this condition was prevented, or at least did not prevail when this mixture was fed.

In experiments conducted by Black, Ellis, Jones and Keating in west-central Texas, urinary calculi in the bladders of steers were commonly found when milo grain constituted the major carbohydrate portion of the fattening ration. The results of the tests indicated that the formation of urinary calculi could be controlled to a considerable degree and prevented in many instances by supplying additional phosphorus in the form of bonemeal. Over a three year period, a high percentage of the steers fed approximately 0.43 lb. of bonemeal per head daily were free from calculi in the bladders at the end of a 182 day feeding period. (The foregoing paragraph taken from the United States Department of Agriculture Bulletin 931, "Comparison of Methods of Supplying Phosphorus in Range Cattle.")

Dr. E. A. Tunnicliff of the Veterinary Research Laboratory at Bozeman, reported the following:

"A calf-feeding experiment was set up with the objective of determining whether extreme carotene deficiency in the feed would induce the formation of calculi. It was planned to feed the calves low carotene hay and to add carotene concentrate to the feed of half of the calves.

"Mr. Wallis Huidekoper of Big Timber, one of our more prominent stockmen and a member of the Advisory Committee of the Laboratory, financed the purchase of 24 grade Hereford calves. These calves came from a ranch near Plevna in southeastern Montana where the summer had been very dry and presumably the grass in the late summer was low in carotene. The calves were of good quality but light. The presumably carotene-free hay proved to contain a small amount of carotene. The calves were then shifted to a straw ration which in turn was not entirely free of carotene. As a result of our inability to obtain carotene-free roughage, the vitamin A blood level of both groups showed little difference and no cases of calculi occurred."

The experiment is being repeated this year under better conditions and it is anticipated some definite information may be forthcoming in the future.

INFECTIOUS KERATITIS
(Pink Eye)

Infectious keratitis has been observed in 203 head of cattle by the Montana Livestock Sanitary Board personnel. It has also been reported by numerous owners in almost every section of the State at all seasons of the year. Years ago infectious keratitis was only observed during the late summer and fall. No doubt the reason for its appearance at all seasons of the year is probably due to the ever-increasing exchange of cattle. Severe loss of condition makes infectious keratitis one of our very costly livestock diseases.

Animals when promptly and properly treated usually make a quick and satisfactory recovery. There is no known preventive worthy of the name at this time, however, there are many preparations on the market today for the treatment of infectious keratitis that are satisfactory if used early and as recommended. It has been found that if affected cattle can be protected against bright sunlight for a day or so, that it helps materially in hastening recovery.

PNEUMONIA IN CATTLE

There were 1,310 cases of pneumonia (hemorrhagic septicemia, shipping fever, pasteurellosis) observed and reported by our deputies this past year. The disease caused little trouble and was rarely seen in native Montana cattle until late in October 1949, but since that time it has appeared in almost every section of the State. It is most commonly seen in weaner calves which have been through saleyards without having first been vaccinated or given a prophylactic dose of immune serum. In several instances native cattle became infected and developed pneumonia

after having been associated for a few days with newly acquired animals. It is evident that newly purchased cattle, and especially those purchased through saleyards, or showing any signs of illness, be kept by themselves for a couple of weeks before being permitted to become a part of the established herd.

Animals handled through stockyards or shipped a considerable distance and subjected to changed climatic conditions or feeding conditions and are more apt to develop disease manifestations than animals grown, located and weaned under normal conditions.

Prevention consists in handling cattle so that their resistance will not be lowered and especially at weaning time. It has been recommended that all calves, and particularly those on ranches on which pneumonia has previously occurred, be vaccinated before weaning with hemorrhagic septicemia bacterin or a pneumonia-mixed bacterin a week or so before weaning, and re-vaccinated again at weaning time. Calves, not previously vaccinated, and purchased through saleyards or otherwise exposed, should be given a prophylactic dose of anti-serum, and vaccinated with the bacterin in about two or three weeks.

CALF DIPHTHERIA

Calf diphtheria has been observed in 134 calves and cattle during the past biennium. Diphtheria has been observed for many years in bucket-fed calves and occasionally in nursing range calves, yearlings and purebred cattle (especially bulls) in the form of necrotic laryngitis. This disease is caused by Spherophorus necrophorus, the organism responsible for many disease conditions in livestock and is ordinarily a secondary invader. When the disease is recognized early and proper treatment administered, recovery is usually prompt.

SPINOSE EAR TICK

The Spinose ear tick (Otibius megnini) has become established on a few ranches in a small area in one county in Montana. This tick causes considerable loss of condition due to irritation and annoyance to the infested animal. Stockmen should make every effort to eradicate this pest. Those who suspect this infestation should make a careful examination of the ears of their cattle and send to our laboratory for identification ticks found in the ears and information for their control.

CANCER EYE

Cancer eye (epithelioma of the eye) is a common condition found in cattle, particularly in those areas where the Hereford breed predominates. While this condition has been observed for many years, it is very much on the increase. Numerous cases are reported by our inspectors at public saleyards where such animals are consigned to quarantine pens and sold as diseased animals. These animals must be sold and consigned to packing houses where Federal, State or Municipal inspection is maintained. Cows showing extensive involvement with secondary glandular metastasis are condemned as unfit for human consumption.

It is recommended that every effort be made to recognize this condition early so that the cow may be sold for slaughter before the

disease condition has advanced to such a stage as to warrant condemnation of the carcass. Cattle with extensive foul smelling cancer eyes with swelling of the eye socket should not be brought to saleyards, but destroyed or sold to a rendering plant. The offspring of cancer-eyed cows should be sold for slaughter and not retained for breeding purposes, as it has been demonstrated that a high percentage of such animals will develop the disease. Bull calves from cancer-eyed cows should be castrated. It is believed that this procedure, if carried out over a period of years, will materially reduce the incidence of cancer eye.

X DISEASE -- HYPERKERATOSIS

Hyperkeratosis, commonly called X Disease, has not been positively diagnosed in Montana, however, a similar disease has been encountered on several ranches in the State. The cause of these diseases has not been determined. Briefly, the most constant symptoms and lesions of hyperkeratosis are: emaciation, lack of appetite, lacrimation, papillomas (warty growths) on the tongue, palate and lips; diarrhea and hyperkeratosis (thickening of the skin). Hyperkeratosis is the most striking lesion. The skin over the neck, shoulders and ribs is thick, hard and wrinkled like that of an animal affected with mange. On some calves the hide has the semblance of a huge flat wart. In addition, many animals show a deformity of the horns; that is, the horns are shrunken, dried, wrinkled and loose from the skull. These symptoms may vary considerably and some may be entirely lacking. The mortality in herds affected may be very high, however, the extent of infection in a herd may range from 1% to 50%. Dr. J. H. Slack of the United States Bureau of Animal Industry, Dr. H. Welch of the Veterinary Department of Montana State College and Dr. E. M. Joneschild of the Montana Livestock Sanitary Board, were delegated to to go Valentine, Nebraska, to observe and study an outbreak of this disease in a herd of calves at the Nebraska Experiment Station. This was one of the largest X Disease herds in the country and one in which all stages of the disease could be studied. Treatment has been unsatisfactory. It is thought by some to be caused by a virus and others are now of the opinion it may be due to some nutritional factor. Until the cause is definitely known, it should be handled as an infectious disease.

WHITE MUSCLE DISEASE

White muscle disease (muscular dystrophy) in calves made its appearance in several herds in the mountain valleys of western Montana in the spring of 1950, however, losses and incidences of the disease were not nearly as great as the previous spring. The reason for this variation is not known.

In keeping with the desires of the stockmen of this area and the desires of this department to obtain more information regarding this disease, a survey of the entire white muscle disease area was made with the result that the Sula Basin area in Ravalli County was selected for intensive observation and study. The area was selected because for the past twelve years heavy losses have occurred in a portion of the valley while absolutely no losses were had in an adjacent well defined area in the same valley. With these facts in mind, the Montana Livestock Sanitary Board, the Veterinary Research Laboratory, the agronomy, geology and nuitrition departments of the Montana State College have surveyed the area with the idea of setting up a definite pattern of research investigation.

This pattern will be followed with most activity taking place during and following calving in the area.

No doubt much valuable information will be obtained, concerning this disease in calves, from the work to be done in this area.

VIBRIONIC ABORTION

Work is under way to develop a satisfactory agglutination antigen which will be used for testing aborting cattle that are negative for brucellosis which may harbor vibrio fetus infection.

MASTITIS

Mastitis constitutes a most serious threat to the dairy industry, and in some states it is definitely recognized as more costly than all other diseases of dairy cattle combined. During the past two summers we have carried on a series of tests in cooperation with dairymen in Lake County to determine the reason for so much mastitis in that area with a high mortality due to gangrenous mastitis. We equipped our traveling laboratory so that tests could be conducted close to the field of investigation and secured the services of a man who was specializing in dairy problems and who had previously conducted some experimental research work in treating mastitis. Some of his findings and recommendations follow:

1. Keep offspring from cows which have given a satisfactory amount of milk without breaking down with mastitis, or with udder weaknesses.

2. Be quiet around dairy cows; avoid rough handling and dogging. An excited dairy cow may easily injure herself or other cows.

3. Be sure milking equipment is clean and sanitary before milking is started.

4. Always milk infected cows last. Milk heifers and non-infected cows first.

5. Wash and dry udder and teats thoroughly, paying particular attention to the end of the teat near the opening.

6. In infected herds wash udder and teats with a chlorine solution (200 parts per million), or other acceptable antiseptic. In such herds use individual cloths or paper towels.

7. Be sure the pulsations on the milker and line vacuum are adjusted to that recommended by the manufacturer.

8. Use rapid milking procedures, with which all dairymen are familiar. With a cloth moistened in a chlorine solution, remove the droplet of milk on end of teat immediately following milking.

9. Eliminate high door sills, logs, etc. where cow may injure the udder.

10. Have ample room in loafing shed. Keep it clean. Avoid exposure of animals to injury and cold.

11. Raise replacements if possible. Do not let calves suck each other.

12. Frequently clean and disinfect platform under cows. One can of lye to 15 gallons of warm water is very satisfactory for this purpose.

13. MOST IMPORTANT OF ALL--isolate all cases of mastitis immediately. Call your veterinarian and start treatment at once. Milk last and thoroughly wash hands following milking.

14. Mastitis can be controlled and to a big extent prevented by GOOD MANAGEMENT ALONE. It was interesting to note that there were as many cases of staphylococcic mastitis as streptococcic mastitis. This is probably due to the fact that the staphylococci are much more difficult to destroy in the udder with penicillin and other drugs than the streptococci. Too, the average dairyman does not follow up on the results of his treatment as closely as necessary to effect complete elimination of the organisms, when such can be accomplished. A summary of the work done on mastitis will be found under "Investigations Synoptically Arranged".

MISCELLANEOUS DISEASES

There has appeared on several ranches in Montana a disease called by some "X disease", and by others "withering disease". It is not the X disease as described under that heading, but may have some of the characteristics. It has been observed in young animals, principally calves, yearlings, and some two-year olds.

The onset is slow and the animal is noticed to be doing poorly. The symptoms and lesions are a rough stary coat, with a scaly dandruff-like condition of the skin, a cracking of the skin around the top of the hooves and between the toes, scratches in the region of the heel, a stiff gait, brown scaly muzzle, nasal discharge and a few small ulcers in the buccal cavity.

Some animals develop a keratitis with discharge from the eyes, but this is not constant. Loss of flesh is rapid especially in young calves on cows. Diarrhea usually appears some time during the course of the disease and most commonly during the latter stages.

The cause of the condition is unknown and treatment has been of no value. Many investigations have been made by representatives of the Montana Livestock Sanitary Board and considerable work has been done by the Veterinary Research Laboratory.

FOOT-AND-MOUTH DISEASE

Foot-and-mouth disease continues to be enzootic in most countries of the world and constitutes a most serious threat to the countries where it does not already exist. Very virulent outbreaks occurred in Southwest Africa, Southern Rhodesia and Egypt. Great Britain experienced fourteen outbreaks, and Denmark five, in the first six months of 1950. The disease invaded a new country this year--Venezuela. This outbreak was given considerable publicity, as it was in one of the two countries in South America which had remained free from the disease. The introduction of foot-and-mouth disease into Venezuela was not surprising in view of the fact that importations of cattle, as well as importations of fresh beef, were permitted from countries where the disease is enzootic. Colombia is the only country in South America now free of the disease.

The situation in Mexico appears satisfactory. Not a single case of foot-and-mouth disease has been diagnosed since late December of 1949. Numerous cases were reported but when investigated proved to be vesicular stomatitis. This disease always causes considerable confusion as it produces symptoms and lesions indistinguishable from foot-and-mouth disease, and the differential diagnoses must be made in a laboratory.

All susceptible animals in the quarantined area have been vaccinated four times and the time for losing the immunity produced by the vaccine has about passed. If any infection remains, the susceptible animals should break any time in the near future. We do not feel the situation is such that the quarantine should be released. At least a year should pass following the last known case of foot-and-mouth disease before the quarantine is released.

From all information available up to this time, much of which was gained in Mexico during their vaccination campaign, we are confident that we should not depend on vaccination for the control and eradication in the United States. Apparently the vaccine has been of some value, but if it had been depended upon entirely as the means of eradication, the disease would have remained active in Mexico. During their campaign, 54,963,619 doses of vaccine were made available for the vaccination phase of the program which ended July 31, 1950. The largest number of animals vaccinated any one month (January 1950) was 5,052,811.

This campaign has been very costly to both Mexico and the United States. Up to September 1st the United States was obligated for more than $120,000,000.

The apparent success of the eradication program in Mexico should not make us overconfident. We must maintain eternal vigilance to prevent the introduction of foot-and-mouth disease into the United States and Canada. This is a never-ending task and one which is difficult enough in normal times, when the main hazard is introduction of the virus. The task is infinitely more difficult in times of emergency, when the possibility of malicious, planned introduction of one of the exotic diseases must be considered.

The success of eradication depends upon early recognition of the disease and prompt suppression. The cooperation of every stockman in Montana is earnestly requested, and we urge that any disease of an unusual nature be reported to this office or to the nearest veterinarian. A 24-hour delay may cost the people of Montana millions of dollars and cause untold suffering and hardship.

S H E E P

SCABIES

As has been declared for many years, sheep scabies has not existed in native Montana sheep since 1917. The last outbreak occurred in imported sheep in 1921. It was promptly detected and the disease eradicated.

This record was very much in jeopardy during the past year. It was learned that there was an extensive outbreak of this scourge near Newell, South Dakota. The infected sheep had been in that vicinity for about two months before the disease was detected. During this two-month period, considerable numbers of sheep were imported into Montana from that area, where 8,000 infected sheep and 60,000 exposed sheep were located.

Immediately upon official confirmation that scabies existed in the vicinity of Newell, South Dakota, the Montana Livestock Sanitary Board dispatched veterinarians to the areas where foreign sheep were located in Montana. Within a period of eight days all imported sheep were located and inspected, and arrangements were made to dip all sheep that were exposed to the disease prior to entry into Montana. Sixty thousand sheep in about 25 bands were located and inspected, and it was found that 13,165 sheep had to be dipped.

Upon the heels of the South Dakota outbreak it was learned that scabies had appeared in Colorado, Idaho, Texas, New Mexico, Kansas and several other states.

The early history of this department demonstrates very definitely that scabies in sheep can be eradicated under adverse conditions, such as existed in Montana prior to 1917, by strict quarantine, effective dipping and thorough follow-up inspections. This has been demonstrated, not only in Montana, but in all of the western range states. The job of eradication was accomplished by a lot of hard work and the expenditure of large sums of money. As every range sheepman knows, he cannot afford to have scabies in his flock or in the state. Because of our severe winters, the disease is much more costly in the northern states than it is in the south. If scabies gained a foothold, all exported Montana sheep could be sold only under severe restrictions, because, with the stigma of scabies attached to them, they just would not be acceptable. The cost of eradication of sheep scabies in Montana some thirty three years ago has paid tremendous dividends to the state.

It does seem a pity that infected sheep from one small area in the south, under Federal quarantine for 32 years could in a short time infect so many scabies-free states and cost many more a lot of time and money in establishing and maintaining preventive measures. However, it does clearly demonstrate just how fast and far an infectious disease can spread. The sheep in the south are of an inferior type, but due to the increase in value of sheep this past year, it became profitable for unscrupulous buyers

to smuggle sheep from quarantine and distribute them to the four winds. It seems to us that this source of infection could have been eliminated many years ago.

Every effort is being made to keep Montana sheep free from scabies. We do know that if any exposed sheep are detected in Montana they will be promptly dipped and properly handled; and should the disease make its appearance, we know that it will be eradicated and adequate measures taken to prevent its recurrence. We say this confidently because of the wholehearted cooperation received this past summer and fall from sheepmen who unfortunately came into possession of exposed sheep.

CONTAGIOUS ECTHYMA

Contagious ecthyma, a virus disease of sheep and goats occurs most commonly in lambs in the fall about shipping time. When it does occur at this time, the financial loss may be heavy, as a health certificate cannot be issued. It may also affect very young lambs and has been observed in older sheep, principally yearling ewes.

Contagious ecthyma is so widely disseminated that lambs not vaccinated are very apt to become infected during the summer, at time of shipping, or in the feed lots soon after arrival at destination. It is, therefore recommended that all lambs be vaccinated at docking time, however, it may be done at anytime, if conditions so warrant.

ENTEROTOXEMIA

(Pulpy kidney disease)

There were 299 cases of enterotoxemia diagnosed in 18,814 sheep inspected. Two thousand two hundred seventy-five were vaccinated against the disease.

As has been recorded in previous reports, this condition usually affects the best, fattest and quickest maturing lambs, usually from two to four or six weeks of age. It also makes its appearance in lambs on lush feed or on heavy concentrated feeds in feed lots. Enterotoxemia has also been diagnosed in yearling ewes and we have reasons to believe that it may appear in older ewes under favorable circumstances.

When enterotoxemia does appear in young lambs, it can be satisfactorily prevented for a time by the use of anti-enterotoxemia serum. Feed lot lambs can be satisfactorily immunized with Clostridium perfringens bacterin, type D. Experimental work is being done to determine methods of prevention in young lambs by immunizing the mother.

FOOT-ROT IN SHEEP

Foot-rot is a disease which has been known for many years in all countries of the world where sheep are raised. It is a disease of the feet produced by an infection which causes the death of the soft tissues just beneath the horn of the hoof causing separation of the soft and horny tissues. This results in severe lameness and deformity of the hooves, emaciation, failure to produce milk, loss of lambs, low wool production and occasionally death.

At the present time the only foot-rot which may exist in sheep in Montana is confined to a band of sheep in Madison County.

We are reasonably sure the disease has been eradicated in Meagher County, but will maintain close observation on all formerly exposed sheep for at least a year after the last known case. Considerable time and expense has been spent during the past two years, both by the owners and the Montana Livestock Sanitary Board, in controlling and eradicating this infection.

It behooves all sheepmen to be on their guard against this disease. Should a number of sheep showing an unexplained lameness appear in a band, the operator should notify the Montana Livestock Sanitary Board at once. Foot-rot is a reportable disease. It is much easier to eradicate when there are only a few cases. A short delay in starting control can be very costly.

PARASITES

Stomach and intestinal parasites are problems that confront sheep growers operating both under pasture and open range conditions. It is especially true in sheep on ranges that are overgrazed and in farm flocks. Parasitic conditions have been reviewed quite extensively in previous reports. Pamphlets issued by the United States Department of Agriculture and the Research Laboratory have been sent to interested sheepmen.

We strongly recommend to all sheep growers that they get in touch with this department if they have parasitic problems with their sheep so that a practical method may be initiated for their control and possible eradication.

It has always been our recommendation that great care be taken when bringing foreign sheep into Montana. Contrary to our wishes, some purebred bucks were imported from an eastern state with the result that they brought with them a heavy infestation of Haemonchus contortus, the barber pole stomach worm, which is rare in Montana, and also numerous other intestinal parasites. A big percentage of these rams died and the others were of no value for service for that year.

Dr. Lee Seghetti is studying the sheep intestinal parasite, Nematodirus, to determine its pathogenicity under our Montana conditions. He is also conducting studies with the sheep tick in an attempt to evaluate the economic importance of tick infestation. Some work with methods of spraying is also under way.

ALWAYS SEGREGATE ALL NEW ADDITIONS, WHETHER NATIVE OR IMPORTED, FOR SEVERAL WEEKS FOR OBSERVATION BEFORE PERMITTING THEM TO MINGLE WITH NATIVE SHEEP.

LIP-AND-LEG ULCERATION

A study of the etiological agent of lip-and-leg ulceration is being conducted at the Research Laboratory, by employing the developing chick embryo, but so far results have been unsatisfactory. The virus is very difficult to isolate and propagate by any known method. During the year, 22,400 sheep were inspected for lip-and-leg ulceration, of which 2,133 were found to be affected. There seems to be a marked increase in the incidence of the disease in most western states.

VIBRIONIC ABORTION

There were 105 cases of vibrionic abortion reported in Montana during 1950 as compared with 60 in 1949.

S W I N E

HOG CHOLERA

During 1950, hog cholera was diagnosed on two premises as compared with 22 in 1949. Most hog cholera breaks in Montana have been traced to the feeding of garbage. All garbage feeding ranches are required to be permanently quarantined and all hogs on such ranches must be vaccinated and held in quarantine until moved for slaughter. A letter of instructions has been sent to all veterinarians requesting them to carefully check all garbage feeding plants in their districts so that the owners may be properly informed of our regulations governing the feeding of garbage. If all hog raisers will follow our regulations governing the feeding of garbage, purchases of hogs from saleyards or imports, hog cholera will not become a serious threat to the industry.

ERYSIPELAS

In 1950, 1,043 hogs were inspected and examined for erysipelas, of which 126 were found to be affected.

BRUCELLOSIS

Brucellosis was not diagnosed in swine in 1950, however, 7 suspected cases were tested with negative results. It is urged that all swine owners strictly comply with all regulations governing the importation of swine and adhere to recommendations governing isolation of all additions. Every effort will be made to eliminate brucellosis from any hog herd in which the disease is diagnosed and, with proper cooperation, it should not become a serious problem in Montana.

VARIOUS DISEASES OF HOGS

During the past year 10,783 hogs were inspected for various diseases including hog cholera. In addition to those diseases mentioned, many swine were found to be heavily infested with the large round worm (*Ascaris suis*). Swine owners have been advised relative to the loss occasioned by parasites and of means for their control.

Sarcoptic mange was diagnosed in forty-five animals and all cases treated. This condition can now be successfully treated and eliminated from any swine herd by the proper application of benzene hexachloride or similar preparations.

D O G S

RABIES

No known case of rabies was diagnosed or reported in Montana during the past year.

We have been extremely fortunate in Montana that rabies has not been a menace to our livestock or to our people as it is in many of the east-central, southwestern and southern states. A serious outbreak did occur in Colorado this year which extended up into Wyoming so we have been very much concerned about the probability of its getting into Montana.

A concerted effort is now being made by the United States Public Health Service, the United States Bureau of Animal Industry, state livestock sanitary organizations and public health organizations to control and eradicate this dread disease. With the cooperation of these agencies and the public, rabies can be successfully eradicated from the United States.

POULTRY

The usual diagnoses of poultry diseases were made in the laboratory this past year, however, there were a few unusual diseases which we wish to mention.

Paratyphoid made its appearance in some imported stock. A bird fancier imported a shipment of canaries from a west coast state and upon arrival they started dying at the rate of six to eight a day. Bacteriological cultures were prepared and the organism recovered was identified as one of the paratyphoids. The remaining birds were placed on sulfamethazine treatment with satisfactory results.

One of our hatcherymen in the state imported some cockerels to be placed in two breeding flocks. Approximately three weeks after the introduction of these birds, both flocks, as well as the imported cockerels, developed fowl pox. Egg production dropped to zero, birds became ill, and mortality was high. One flock owner experienced approximately 10% loss and the other owner lost almost his entire flock. Investigations were immediately started to determine the source of infection, as this was the first time fowl pox had been diagnosed in Montana. The flocks were condemned, destroyed, and indemnity paid by this department. Both premises were thoroughly cleaned and disinfected under official supervision. Due to quick action and cooperation on the part of everyone concerned we were able to destroy the infection and prevent any further spread of the disease. It was interesting to learn that investigations by officials of the state of origin revealed that the cockerels had been shipped in contaminated coops which had been borrowed.

Two turkeys were brought to the laboratory and the owner reported that the birds were weak, growth was slow and mortality had been high. Microscopic examinations of the intestinal contents revealed the presence of myriads of flukes. (Echinoparyphium revolutum.) These birds had been raised on wet, marshy pasture land, and had been drinking out of old stagnant pools. The owner was advised to move the flock to high, dry pasture and to provide drinking water from a known clean source. The owner reported recovery of the remaining birds.

Erysipelas in turkeys was diagnosed this fall in a flock of 900 birds. The owner reported 6% of his birds had to be removed from the flock and most of those were toms. He reported that the birds became either paralyzed or developed a limp due to swollen hock joints or feet. As the disease progressed, the birds became weaker and either died or were pecked to death. It was recommended that the flock be moved to a new range and the hospital group treated intramuscularly with penicillin.

We are disturbed over the increase in number of cases of so-called "pullet disease" in Montana. This virus disease usually attacks a flock just as it starts into production, and is characterized by purple discoloration of the comb and wattles, high temperature and sudden death. Mortality may be

high if it is not diagnosed promptly and the flock placed on treatment immediately. Certain therapeutic measures may be taken, and usually with favorable results, if applied in the early stages of the acute form. We have found that molasses added to the drinking water periodically for 2 or 3 days will correct the condition satisfactorily. There have been a number of cases diagnosed in Ravalli and Fergus counties this year. In some of these cases the mortality exceeded 10% due to time and distance involved in arriving at the laboratory for diagnosis. This disease is a serious problem due to its acuteness and the economic loss involved.

We have had a number of cases this past year of over-treating. Since sulfa drugs have been placed at the disposal of the poultry industry we find they are often misused. The general public still leans toward the belief "If a little is good, more won't do any harm". The manufacturers state plainly on the labels of their products, how much of a certain drug should be used and the exact directions as to its administration. One of these drugs is used for instance for 2 days, withheld 4 days and administered again for 1 day. Many poultry producers feel the birds should be given something during the 4 days that the sulfa drug is being withheld. Consequently they will treat with various drugs during that period and as a result neither of the drugs is beneficial and in some cases there is a possibility that the indiscriminate use of the combined drugs may cause poisoning or toxemia. Educating the public in the proper use of administering drugs is a constant problem to the Montana Livestock Sanitary Board.

Newcastle disease was not too big a worry during the past year, however, we are constantly watching for it. The serological test for Newcastle disease is established as a routine test in our laboratory and no diagnosis of a respiratory disease is made until the possibility of Newcastle disease has been eliminated. There was one large outbreak in a broiler plant caused from imported chicks. A cleaning and disinfecting program was outlined and vaccinated chicks were secured for replacements, so as a result the plant was able to remain in business during the time of eradication of the disease.

This department, the Montana Poultry Improvement Board and the hatcherymen of the state are continuing measures for the control and eradication of pullorum disease. Through everyone's efforts, the chick hatcheries in Montana are raising their standards and placing a much higher quality chick on the market. Testing for pullorum disease and constant culling involves a great deal of time and expense, but the results are gratifying. During the past year 70,000 birds were tested for pullorum disease by testing agents and state testers.

A total of 50,110 birds were inspected in the field by field veterinarians and laboratory personnel.

A total of 809 birds were examined in the laboratory this past year.

For the past eight or ten years, a representative of this department has had charge of the health of all the poultry exhibited at the North Montana State Fair, the Midland Empire State Fair and some of the small county fairs. Inspections are made at the time the birds are entered in the display room and daily inspections are made thereafter. Many exhibitors come from other states to show their birds, so it is imperative that all birds be checked from a health standpoint to eliminate any possibility of an outbreak of disease during the fair. Usually 1,000 to 2,000 birds are shown at the larger fairs. So far we have been fortunate in controlling any disease which appeared, but we must maintain constant vigilance in order to keep that record.

DAIRY AND MILK INSPECTION

(Sanitary Supervision of the Production and Distribution of Fluid Milk and Cream in the State of Montana)

With the advent of better highways; modern refrigerated trucks, single-service containers (paper bottles); rural electrification, making mechanical refrigeration possible; and the many other technological advancements in the dairy industry, dairying has gone through and is going through many revolutionary changes. The distribution of milk and cream is no longer a local problem, since milk and cream produced in one locality does, in many instances, virtually receive state-wide distribution. The milk producer and milk distributor face a competitive market never before experienced.

The small, local retail raw dairy is rapidly fading out of the picture. There are very few remaining in the State. Just about all the milk and cream consumed in Montana is distributed by milk plant operators, who purchase the milk from dairy producers, pasteurize and bottle the product and distribute it to the consumer.

It is indeed gratifying to see the way milk plant operators are keeping abreast with modern methods of handling milk, through the installation of such equipment as the latest types of high-temperature, short-time pasteurizing units, improved cooling equipment, homogenizers, bottling machines, bottle washers and many other items. The dairy producers are also very progressive in accepting improved equipment, such as mechanical refrigeration and newer types of milking machines, and building and using modern milking stables and milk houses. All of these things make for the distribution of a safer and higher quality milk and cream.

Milk dispensers have been widely installed throughout the State this past year. They are mechanically refrigerated compartments that house the milk container, and the milk is drawn off by means of a spigot. Three types of these dispensers have been approved by this department to date as being of sanitary construction and operable in a sanitary manner. Users report that these improved dispensing devices have very materially increased the sale of milk.

Because of the revolutionary changes in distributing milk, the responsibilities of the Montana Livestock Sanitary Board in assuring the consumer of a safe, wholesome milk and cream supply have greatly increased and become more complex. In addition to this increased work, we licensed 1154 dairies and 73 milk plants in 1950. This is the largest number of dairies and milk plants licensed by this department in the last twenty years, or since the adoption of our present regulations. We licensed 971 dairies and 70 milk plants in 1949.

To assure a safe milk supply, all dairies and milk plants are routinely inspected and scored to determine whether or not they comply with Montana Livestock Sanitary Board Regulation I. All dairies and milk plants must comply with Regulation I (adopted from the Standard Milk Ordinance and Code of the United States Public Health Service) before they are granted a license. The cattle are periodically checked for brucellosis and tuberculosis, as well as for mastitis. Routine milk samples are collected for complete laboratory examination, both bacteriological and chemical. In the field, milk samples are routinely checked by the reductase, rezasurin and

phosphatase tests and examined for visible dirt by use of sediment pads. During the year, 655 milk samples were checked by the reductase test in the field.

Unfortunately, it has been necessary to issue degrading orders to a few dairy operators and one milk plant operator who failed to produce and handle milk in an approved and sanitary manner. It was necessary in two instances to issue restraining orders to prevent the sale of cream because of its unsafe qualities.

Many meetings of milk producers and distributors throughout the State have been attended by representatives of this department to discuss sanitary methods of producing and distributing milk. A representative of this department cooperated with the Montana State College Dairy Division in putting on their "Quality Milk Schools" in Great Falls, Billings, Kalispell, Missoula, Helena, Butte, Livingston and Bozeman.

The various city and county health departments, where established, have been of material assistance to this department in supervising sanitary milk production and distribution.

It gives us pleasure to report that the Montana Milk Producers Association, the Montana Milk Distributors Association and the dairymen in the State have been most cooperative and have greatly assisted this department in carrying out its duties and assuring the people of Montana of a safe, wholesome milk supply.

PUBLIC SALEYARDS

It has been stated that 75% of the livestock marketed in Montana passes through Montana auction markets. It is a well-known fact that the spread of many of the infectious diseases of livestock takes place through the movement of animals. Therefore, a tremendous responsibility is placed upon the operators of public saleyards in helping safeguard the greatest industry Montana has - - - the livestock industry. The operators of public saleyards have assumed this responsibility, evidenced by the fact that practically all markets in Montana have been improved to comply with Regulation 36 and made as sanitary as possible. The Montana Auction Markets Association is to be congratulated for its sincere desire to assist in every way possible in the control and eradication of infectious diseases. At its own expense, the Association has been carrying on an educational program for the control of brucellosis that is meeting with widespread favor.

Continued progress must be made if the order buyer, the packer, the feeder, and the stockman are to be assured that only healthy vigorous, productive animals are loaded out of Montana saleyards and if every one concerned is to prosper.

RENDERING PLANTS

The Montana Livestock Sanitary Board has licensed six rendering plants since the enactment of a law by the 1948 Legislature requiring that regulations be promulgated by this department governing rendering plants and requiring that plants complying with the regulations be licensed. The licensed rendering plants are located at Sidney, Billings, Miles City, Dillon, Havre and Missoula. These plants serve a very useful purpose when they are

operated in compliance with regulations such as ours. The operators not only remove dead animals and render them incapable of disseminating disease and becoming a public nuisance, but they salvage hides and obtain tallow and meat meal that otherwise would be wasted. On many occasions very material assistance has been received from the rendering plant operators, in that they have notified this department of the presence of a disease which we were able to locate and suppress.

MEAT INSPECTION

The Montana Livestock Sanitary Board now maintains meat inspection in fourteen establishments in the State. There are four establishments under Federal meat inspection.

The City of Great Falls and the City of Billings passed ordinances in 1950 requiring that meat sold within their city limits must be inspected and passed either by the Montana Livestock Sanitary Board or the United States Bureau of Animal Industry. Helena, Missoula, Butte and Anaconda already have similar ordinances, and only inspected and passed meats are allowed to be sold within the limits of these cities.

The following plants in Montana now maintain meat inspection:

United States Bureau of Animal Industry Inspection:
- Great Falls Meat Company, Great Falls
- Hansen Packing Company, Butte
- Pierce Packing Company, Billings
- Midland Packing Company, Billings

Montana Livestock Sanitary Board Inspection:
- John R. Daily Co. Inc., Missoula
- John Schramm and Son, Missoula
- Western Meat Packing Company, Missoula
- Frazer Meats, Stevensville
- Montana Meat Company, Helena
- Leonard Franks, Helena
- Vollmer and Sons, Bozeman
- Livingston Packing Company, Livingston
- Guy Barsotti's, Vaughn
- Berger Meat Company, Great Falls
- Montana Market, Great Falls
- Havre Abattoir, Havre
- Heath and Kimmel, Ronan
- John Wilkerson,(part time) Hamilton

This public service, with the exception of supervision, is maintained at the expense of meat packers who have State meat inspection. The fee for meat inspection is paid directly to the Montana Livestock Sanitary Board, which in turn employs the inspectors.

During the year 1950 the following animals were inspected:

Cattle - - -	11,703
Calves - - -	2,253
Swine - - -	26,957
Sheep - - -	1,487

A total of 42,390 head of animals were inspected and passed by the

Montana Livestock Sanitary Board. Four cattle and 8 swine were passed for cooking. Forty three cattle were condemned as unfit for food, as were 11 calves, 53 swine and 5 sheep. In estimated weights, 15,548,660 pounds of meat were passed as fit for human consumption, and 56,356 pounds of meat on entire carcass condemnations were found unfit for human food and taken out of food channels.

The above figures show beyond a doubt that meat inspection is very necessary to public health, and should be established wherever possible. Not only is a valuable public health service rendered through meat inspection, but oftentimes the source of an animal disease, such as tuberculosis, may be detected. A diseased animal found on the killing floor may be traced back to the farm or ranch where it originated and disease-control measures instituted.

SUMMARY OF CONDEMNATIONS MADE IN 1950 -- MONTANA MEAT INSPECTION

	Cattle			Swine			Calves			Sheep	
Disease	Cook	Con'd.	Parts	Cook	Con'd.	Pts.	Cook	Cond.	Pts	Cond.	Pts.
Tuberculosis					1	1989					
Actinomycosis		2	176								
Pneumonia	1	2	3	3	6	219					9
Septicemia		6			12			1			
Cysticercus b.			7								
" t.						35					6
Bruises & Injuries		1	19			180		1	4		34
Abscesses			93	2		355			17		11
Epithelioma		1	17			3					
Arthritis			2		1	5					1
Mastitis	1	1									
Pericarditis		4	3			13					
Urinary calculi		1						4			
Peritonitis	1	5		1	5						
Pyemia		3			4			1		1	
Toxemia		3						2			
Hydronephrosis			9			1144					
Cachexia		8			4			1		3	
Pylonephritis		1									
Malignant edema		1									
Metritis		2									
Pyonephritis	1	1	1								
Nephrosis			1								
Urine or sex odor		1			2						
Misc.(swine livers)						1749					
Enteropneumatosis						5					
Erysipelas					6	2					
Gastroenteritis					1						
Ascites					1						
Necroenteritis					1						
Uremia					1						
Icterus					5						
Dermatitis						1					
Enteritis				1							
Contamination				1		12					
Improper bleeding					1						
Moribund					1					1	
Hepatitis					1						

(continued) Disease	Cattle Cook	Cond.	Parts	Swine Cook	Contd	Parts	Calves Cook	Con.	Pts.	Sheep Cond.	Pts.
Distomiasis									11		27
Hemorrhagic sept.								1			
Thysanasoma ac.											14
Echinococcus cyst											2
Focal necrosis											15
Totals	4	43	331	8	53	5712		11	32	5	119

Beef Liver Condemnations:

Abscesses	1220
Cirrhosis	35
Telangiectasis	92
Sawdust	8
Distomiasis	1390
Contamination	44
Fatty Degeneration	3
Angioma	1
Melanosis	3
Total	2796

STALLION REGISTRATION BOARD

During the year 1950, the Montana Livestock Sanitary Board, acting as the Stallion Registration Board, renewed one license for a purebred stallion.

While there continues to be a marked interest in horseback riding, there does not seem to be a commensurate demand for the better and more expensive individuals. Montana has a number of light-horse breeding establishments which are raising some very fine horses, thereby creating a good source of supply for horses for our cattle ranches and pleasure riding.

MONTHLY LETTER

The practice of issuing a Monthly Letter to all veterinarians has been continued this year. By issuing this Monthly Letter, we give to every veterinarian in the State of Montana, an over-all picture of the livestock disease conditions throughout the State, and probable dangers from other states.

MONTANA LIVESTOCK SANITARY BOARD

I wish to express to the Montana Livestock Sanitary Board members my appreciation of the kind consideration and courtesy they have extended to me personally. On behalf of the Montana Livestock Sanitary Board corps, I express to the Board the appreciation of every member of the corps for the advice and consideration which has been extended to them.

I would be amiss in my duties if I did not call to the attention of the stockmen of Montana the untiring efforts of the members of the Board and the valuable service they have given in behalf of the industry. It should also be known by all that members of the Livestock Sanitary Board receive no compensation for their time when attending board meetings and hearings.

We call your attention to the Bacteriological and Pathological Laboratory report by Dr. A. M. Jasmin, and trust that it will be read, as it illustrates the scope of work and the value of a diagnostic laboratory. Without a correct diagnosis, proper therapeutic agents cannot be prescribed, nor can satisfactory methods of control and eradication be initiated. A diagnostic laboratory is indispensable in the efficient control of diseases.

CHEMICAL LABORATORY

The work of the Chemical Laboratory has noticeably increased during the past year. Its findings are valuable in making proper diagnoses and in establishing disease-control measures. With the passing years, chemistry enters more and more into all branches of medicine and especially into the field of nutrition. Chemical findings have been of great assistance in determining vitamin and mineral deficiencies.

HONORABLE STATE BOARD OF EXAMINERS

Again we express to the Honorable State Board of Examiners our appreciation for the many courtesies and considerations they have extended to this department and the livestock industry of Montana.

COOPERATING AGENCIES

We express our appreciation to Dr. G. W. Cronen, Inspector in Charge, United States Bureau of Animal Industry, for his good counsel and advice and to his field force for the assistance rendered.

We express our appreciation to the State Board of Health and to county, city and local boards of health and sanitary officers for their excellent cooperation and help.

We thank the stockgrowers, woolgrowers, dairymen, saleyard operators and poultrymen of Montana for their continued cooperation with all members of this department.

It is because of this splendid cooperation throughout the years that we have made such an enviable record in disease-control.

Respectfully submitted,

H. F. WILKINS, D. V. M.
State Veterinary Surgeon and
Executive Officer.

HFW:td

REPORT OF THE BACTERIOLOGIST AND PATHOLOGIST

ARTHUR M. JASMIN, D.V.M.

During the year ending November 30, 1950, there were 44,670 specimens examined in the laboratory. The material consisted of blood, smears, skin scrapings, exudates, vaccines, pus, feces, plants, parasites, tissues, milk, cream and water.

The following species of animal and bird life represented by these specimens include horses, cattle, sheep, swine, goats, dogs, cats, deer, rabbits, chinchillas, chickens, turkeys, geese, canaries, eagle, ducks and pheasants.

Following is a classified list of diagnoses made, giving the number of positive, negative and suspicious findings in each case:

It will be noted that 345 specimens were submitted to the laboratory for examination for anaplasmosis, with 32 or 10.78% showing positive or suspicious reactions. This is a marked increase over 18 specimens submitted for the same examination last year.

The complement-fixation tests were made with the cooperation of the United States Bureau of Animal Industry Laboratories in Washington, D.C.

There was also a marked increase in specimens submitted for bacillary icterohemoglobinuria examinations; 618 as compared to 133, or an increase of 485 specimens over the previous year.

In all 44,670 specimens were examined this year as compared to 39,578 specimens the previous year, an increase of 5,092.

Should the demand for anaplasmosis examinations continue, it will be necessary to conduct complement-fixation tests in this laboratory. This with the concurrent increase in specimens may necessitate an increase in laboratory personnel and equipment.

		POSITIVE	NEGATIVE	SUSPICIOUS
Abortion, vibrionic	Cattle		6	
" "	Sheep	2	2	
Abscesses, Corynebacterium	Cattle	3		
" Mixed bacteria	Cattle	6		
" "	Horses	2		
" "	Sheep	3		
" "	Swine	1		
" staphylococcus	Cattle	3		
" "	Dogs	1		
" "	Human	1		
Actinobacillosis	Cattle	14		
Anaplasmosis, blood smears	Cattle	16	29	
* " complement-fixation	Cattle	7	280	9
Anthrax	Cattle		4	

		POSITIVE	NEGATIVE	SUSPICIOUS
Arthritis, staphylococcus	Chickens	1		
" "	Turkeys	6		
Asphyxiation	Swine	1		
Bacillary icterchemoglobinuria (red water)				
" agglutination test	Cattle	83	440	88
" tissue examination	Cattle	4	2	
Blackhead	Chickens	1		
"	Turkeys	49		
Blackleg	Cattle	15	7	
Bloat	Rabbits	2		
"	Sheep	1		
Botulism	Cattle	1		
Brucellosis:				
" agglutination test	Cattle	1,317	34,340	2,492
" "	Horses	1	1	
" "	Goats		29	
" "	Swine	2	8	
" milk "	Cattle	89	905	
" tissues, (culture isolation)	Cattle	2	8	
" " "	Human		2	
" " "	Swine	1		
Caseous, lymphadenitis	Horses	1		
"	Sheep	2		
Cholera	Swine	3	1	
Colibacillosis	Chickens	29		
Coryza	Chickens	12		
"	Turkeys	2		
Cowpox	Cattle	3		
Crooked toes	Chickens	1		
Crop bound	Chickens	1		
Diphtheria, necrotis laryngitis	Cattle	1		
" "	Swine	1		
Enteritis, gastro	Dogs	1		
" hemorrhagic	Cattle	1		
" necrotic	Horses	1		
" "	Swine	7		
Enterotoxemia	Cattle		8	
"	Sheep		5	
" (Type A welchii)	Cattle	6		
" " "	Sheep	1		
" (Type D welchii)	Cattle		3	
" " "	Sheep	13		
Erysipelas, agglutination test	Swine	4	3	
" tissue examination	Swine	6	5	
" " "	Sheep		1	
" " "	Turkeys	1		
Fitness for food	Cattle	8	1	
"	Chickens	2		
"	Deer	1		
"	Swine	3		
Fowl pox	Chickens	2		
Gout	Chickens	6		
Heat Prostration	Rabbits	2		
"	Turkeys	12		

		POSITIVE	NEGATIVE	SUSPICIOUS
Hepatitis	Dogs	1		
Hepatic coccidiosis	Rabbits	3		
Infectious anemia	Horses		9	
Infectious bronchitis	Chickens	45		
"	Turkeys	2		
Infectious diseases	Cattle		17	
"	Chickens		109	
"	Goats		1	
"	Pheasants		7	
"	Rabbits		2	
"	Swine		9	
"	Turkeys		9	
Identification of Specimens:				
" Larvae of aquatic fly		1		
" German cockroach		1		
" Poisonous plant		1		
Intussusception of intestines	Cattle	1		
Keratitis	Cattle	1		
Laryngotracheitis	Chickens	4		
Leptospriosis, tissue examination	Cattle		2	
" " "	Dogs	1	1	
Leukosis " "	Chickens	12		
Malignant edema	Cattle	20	7	
"	Sheep	1		
"	Swine	1		
Mastitis, gangrenous	Cattle	2		
Navel ill	Cattle	1		
Necrobacillosis	Cattle	4		
Neoplasms	Cattle	5		
"	Deer	2		
"	Dogs	5		
"	Horses	2		
Nephritis	Cats	1		
Normal specimens	Chickens	12		
"	Turkeys	5		
Nutritional deficiency	Swine	2		
"	Chinchilla	2		
Obstruction	Rabbit	1		
Omphalitis	Turkeys	10		
Panleucopenia	Cats	1		
Parasites, External.				
" Sarcoptic mange mites	Cattle	1	6	
" Chicken mites	Chickens	4		
" Lice	Cattle	1		
" Ringworm	Cattle	2		
" "	Dog	1		
" "	Horses	2		
" Skin worms, habronema	Mallard	1		
Parasites, Internal (Fecal Examination)	Cattle	19	2	
" "	Cats	2	2	
" "	Dogs	22	24	
" "	Horses	45	5	
" "	Sheep	1		
" "	Swine		1	

		POSITIVE	NEGATIVE	SUSPICIOUS
Parasites, Intestinal examination:				
" ascarids	Cattle	6	7	
" coccidial oocysts	Cattle	7		
" "	Chickens	86		
" "	Eagle	1		
" "	Rabbits	1		
" "	Sheep	1		
" "	Turkeys	11		
" cysticercus pisoformis	Dogs	1		
" " "	Rabbits	1		
" flukes, (Echinoparyphium revolutum)	Turkeys	2		
" Taeniidae	Cattle	3		
" "	Chickens	9		
" "	Turkeys	1		
" trichostrongyle	Cattle	3		
" "	Sheep	7		
Parasites, Tissue examination:				
" flesh fly larvae (Wohlfartia vigil)	Cats	1		
" " "	Dogs	7		
Paratyphoid	Canaries	7		
Peritonitis	Chickens	5		
"	Dogs	1		
"	Goose	1		
"	Swine	1		
Perosis	Chickens	1		
"	Turkeys	5		
Photosensitization	Cattle	1		
Pneumoencephalitis (Newcastle disease)				
" Hemagglutination inhibition test	Chickens	33	60	
" " "	Turkeys		12	
Pneumonia, gangrenous	Cattle	2		
" mixed infection	Chinchilla	1		
" " "	Rabbits	1		
" mycotic	Cattle	2	1	
"	Rabbits	1		
" pasteurella	Cattle	11		
" "	Dogs	1		
" "	Sheep	8		
" "	Swine	1		
Pododermatitis	Cattle	1		
Poison, forage	Cattle	2		
" "	Rabbits	2		
" sweet clover	Cattle	1		
Pregnancy disease	Sheep	2		
Pseudotuberculosis	Deer	3		
Pseudoleukemia	Cattle	1		
Pullet disease	Chickens	21		
Pullorum disease:				
" agglutination test	Chickens	72	10	
" bacteriological test	Chickens	47	23	
" " "	Turkeys		20	

		POSITIVE	NEGATIVE	SUSPICIOUS
Pyelonephritis	Cattle	4		
"	Swine	2		
Rabies	Cats		1	
"	Dogs		5	
Salmonellosis	Dogs	1		
"	Swine	10		
Swine anemia	Swine	1		
Tetanus	Sheep	2		
Tetany, calf	Cattle	1		
Toxemia, shipping	Horses	3		
Trauma	Chickens	11		
"	Deer	1		
"	Dogs	2		
"	Rabbits	3		
"	Swine	2		
Trichomoniasis	Cattle		6	
Tuberculosis	Chickens	22		
"	Turkeys	1		
** Tularemia, agglutination test	Dogs	4		
Unsatisfactory specimens:				
Blood samples		8		
Bovine tissue		27		
Horse tissue		2		
Sheep tissue		2		
Swine tissue		3		
Dog tissue		2		
Milk samples		10		
Fowl		17		
Urinary calculi	Cattle	1		
Urticaria	Swine	1		
Viability of vaccines		27	2	
Vitamin A deficiency	Chickens	21		
" D "	Chickens	2		
" G "	Chickens	3		
White muscle disease	Cattle	1		
Milk samples for bacterial count		728		
" " for E coli determination (Plate)		166	577	
" " for Streptococcus " (Plate)		37	61	
" " " " determination (Smear)		169	424	
" " " Staphylococcus " "		65		
" " " leucocyte " "		75		
" " " corynebacterium " "		6		
" " " methylene blue "		45		
" " " ring test (brucellosis)		459		
" " " laboratory pasteurization		6		
Cream " " bacterial count		102		
" " " E. coli determination (Plate)		33	68	
Water " " bacterial count		6		
" " " E. coli determination "		5		
TOTAL 12-1-1949 to 11-30-1950		4,505	37,576	2,589
" 12-1-1948 to 11-30-1949		4,245	32,831	2,502
TOTALS FOR BIENNIUM		8,750	70,407	5,091

*Complement-fixation tests for anaplasmosis were made by U.S.Bureau of Animal Industry.

** Agglutination tests for tularemia were made by the U.S.Public Health Laboratories, Hamilton, Montana.

REPORT OF THE CHEMIST

FRANK J. PEACOCK, B.S.

The chemical laboratory has analyzed the usual routine samples for poisons in the past year. In addition to the routine poison analyses, this laboratory began checking various samples, such as hay, blood and urine, for the presence of selenium. Selenium poisoning of cattle has been confirmed in several states bordering Montana and has been suspected in some counties in Montana for many years. The samples analyzed in the past year have all been negative, but samples will continue to be checked for selenium whenever this poison is suspected.

Blood chemistry is one of the duties of this laboratory. The number of blood samples analyzed greatly increased in 1950 in comparison with 1949. Vitamin A and phosphorus have been found to be lacking in the diets of many herds. The 85 blood samples which were analyzed for phosphorus consisted of 36 deficient samples and 49 samples which contained sufficient amounts of phosphorus. Of the 68 samples which were analyzed for vitamin A, 37 were found to be deficient. There were very few cattle in the State found to be deficient in calcium or magnesium. Thus, the nutritional problem in this State primarily centers around phosphorus and vitamin A. The majority of deficiency cases were diagnosed in the first four months of 1950. Undoubtedly many more herds in Montana were deficient in vitamin A and minerals during the past year but were not brought to the attention of either this laboratory of the Veterinary Research Laboratory at Bozeman.

Seventeen cases of arsenic poisoning were detected in the State during the past year. Thirteen of these cases occurred in cattle, one in a hog and three in horses. There was only one case of lead poisoning diagnosed. This occurred in a cow. Strychnine was found to be present in the stomach contents of eleven dogs and two horses. Strychnine was also found in three meat samples which were evidently used to poison dogs. One sample of meat was found to contain a large amount of Paris Green, an arsenical compound. There were several cases of oat hay (nitrite) poisoning in the past year. One of these cases involved the loss of 41 head overnight of a herd of 67 cattle.

There were twenty water samples brought to this laboratory from wells, springs and reservoirs to be analyzed for fitness for livestock consumption. Five of these samples were found to be unfit for livestock consumption because of high laxative-salt content. The results of some samples which were analyzed by the State Board of Health were forwarded to this laboratory for interpretation as to the fitness of the water for livestock consumption.

The chemical analysis of milk samples was one of the major duties of this laboratory during the past year. Two new analyses were instigated on milk samples during 1950. These were the acidity and chlorides tests. An acidity above the maximum allowed indicates old milk, and high chloride indicate the possibility of mastitis in a herd. A total of 379 milk samples were tested for proper pasteurization, and eight of these samples were found to be improperly pasteurized. Four cream samples were found to be improperly pasteurized in the total of 78 analyzed. Two milk samples were found to be adulterated due to leaking coolers.

SAMPLES FOR POISON ANALYSES

Stomach Contents, Tissues, etc.

TYPE	ARSENIC Pos.	ARSENIC Neg	LEAD Pos.	LEAD Neg.	STRYCHNINE Pos.	STRYCHNINE Neg.	BARBITURATES Pos.	BARBITURATES Neg.	NITRITES Pos.	NITRITES Neg.	TOTAL Samples	TOTAL Analyses
Bovine	14	60	1	65	0	1	0	0	1	0	76	142
Canine	0	16	0	8	11	17	0	1	0	0	30	53
Porcine	1	6	0	6	0	0	0	0	0	0	7	13
Equine	3	5	0	5	2	4	0	0	0	0	10	19
Ovine	0	3	0	3	0	0	0	0	0	0	3	6
Avian	0	2	0	2	0	0	0	0	0	0	2	4
Fur-bearing	0	1	0	1	0	0	0	0	0	0	1	2
TOTAL	18	93	1	90	13	22	0	1	1	0	129	239

Stomach Contents, etc. continued

TYPE	SODIUM CHLORIDE Pos.	SODIUM CHLORIDE Neg.	CERESAN Pos.	CERESAN Neg.	CRESOL Pos.	CRESOL Neg.	CYANIDES Pos.	CYANIDES Neg.	ZINC Pos.	ZINC Neg.	TOTAL Samples	TOTAL Analyses
Bovine	0	0	0	1	0	0	0	2	0	0	3	3
Porcine	0	2	0	1	0	2	0	0	0	0	4	5
Avian	0	0	0	0	0	0	0	0	0	1	1	1
Total	0	2	0	2	0	2	0	2	0	1	8	9
							TOTAL FROM ABOVE TABLE				129	239
							GRAND TOTAL				137	248

MISCELLANEOUS SAMPLES FOR POISON ANALYSES

TYPE	ARSENIC Pos	ARSENIC Neg	LEAD Pos	LEAD Neg.	STRYCHNINE Pos	STRYCHNINE Neg.	CERESAN Pos	CERESAN Neg.	NITRITES Pos.	NITRITES Neg.	CYANIDE Pos.	CYANIDE Neg.	TOTAL Samples	TOTAL Analyses
Grain	3	3	0	3	0	1	0	3	0	0	0	0	8	13
Bovine liver	0	1	0	0	0	0	0	0	0	0	0	0	1	1
Oil sludge	0	1	0	0	0	0	0	0	0	0	0	0	1	1
Powder	1	3	1	1	0	0	0	0	0	0	0	0	4	6
Pole scrap-ings	0	1	0	0	0	0	0	0	0	0	0	0	1	1
Hay	0	0	0	0	0	0	0	0	2	3	0	0	5	5
Bones	0	1	0	0	0	1	0	0	0	0	0	0	1	2
Meat	1	3	0	2	3	4	0	0	0	0	0	0	8	13
Mine tail-ings	1	0	0	0	0	0	0	0	0	0	1	0	1	2
Water	0	0	0	0	0	0	0	0	0	0	1	0	1	1
Dirt	0	1	0	0	0	0	0	0	0	0	0	0	1	1
Candy	0	0	0	0	0	1	0	0	0	0	0	0	1	1
Totals	6	14	1	6	3	7	0	3	2	3	2	0	33	47

MISCELLANEOUS EXAMINATIONS OTHER THAN POISONS

Water samples for complete analyses	20
Water samples for total solids and sulfates	4
Plants for selenium	9
Blood samples for selenium	3
Water sample for selenium	1
Urine sample for selenium	1
Urine samples for albumin	3
Grain samples for fat, fibre, moisture, protein, ash and manganese	2
Liver samples for D. D. T.	2
Urine sample pH	1
Ground barley sample for ergot	1
TOTAL	47

BLOOD ANALYSES

TYPE OF BLOOD	P	Ca	Mg	Carotene	Vitamin-A	TOTAL Samples	TOTAL Analyses
Bovine	95	90	85	78	77	98	425
Ovine	14	11	10	14	14	14	63
Porcine	3	3	2	2	2	3	12
Equine	6	6	6	0	0	6	18
Total	118	110	103	94	93	121	518

MILK AND CREAM SAMPLES

MILK:	For Butterfat content: (includes 47 unofficial samples)	699
"	Solids not fat (includes 17 unofficial samples)	667
"	Lactometer reading (includes 17 unofficial samples)	667
"	Total solids (calculated - - includes 17 unofficial samples)	667
"	Sediment test (includes 17 unofficial samples)	663
"	Phosphatase test, indicating proper pasteurization (includes 1 unofficial sample)	371
"	Phosphatase test, indicating improper pasteurization	8
"	Samples tested for adulteration	2
"	Acidity test (includes 7 unofficial samples)	340
"	Chlorides test (includes 7 unofficial samples)	340
CREAM:	For Butterfat content (includes 3 unofficial samples)	123
"	Phosphatase test, indicating proper pasteurization	74
"	Phosphatase test, indicating improper pasteurization	4
"	Acidity test	71
"	Chlorides test	71
TOTAL.		4,772

(Note: this includes 827 individual samples submitted for chemical analyses).

SUMMARY OF SAMPLES ANALYZED

	TOTAL SAMPLES 1950
Stomach contents, tissues, etc. for poisons.	137
Miscellaneous samples for poison analyses	33
Miscellaneous examinations, other than poisons . . .	47
Blood analyses	121
Milk and Cream Samples	827
	1,165

	TOTAL ANALYSES	TOTAL SAMPLES
Total for 12-1-49 to 11-30-50	5,632	1,165
Total for 12-1-48 to 11-30-49	5,010	1,220
GRAND TOTAL FOR BIENNIUM	10,642	2,385

INVESTIGATIONS SYNOPTICALLY ARRANGED INCLUDING COOPERATIVE WORK WITH THE UNITED STATES BUREAU OF ANIMAL INDUSTRY

1950

HORSES

Horses tested for brucellosis	4
Reactors	3
Suspects	1

ENCEPHALOMYELITIS

Number inspected	272
Cases	9

MISCELLANEOUS INSPECTIONS

Number inspected	831

SCABIES

Number inspected	18
Cases	None

GLANDERS

Number mallein tested	1
Reactors	None

INSPECTIONS FOR INTERSTATE SHIPMENT

Clinically inspected	2,088

C A T T L E

TUBERCULOSIS

Dairy cattle tested	15,620
Reactors (only one showing post-mortem lesions indicative of tuberculosis)	5
Percentage of reactors	.0003
Other cattle tested	2,664
Reactors	None
Cases reported on post-mortem inspection	1

ACCREDITED TUBERCULOSIS-FREE HERDS

Number of herds tested	4
Number of cattle tested	238
Number of reactors	None

TESTS FOR INTERSTATE SHIPMENT

Tuberculin tested	1,437
Reactors	None

TOTAL CATTLE TESTED FOR TUBERCULOSIS

Number	19,959
Total reactors	5
Percentage of reactors	.0002

CATTLE INSPECTED AT DESTINATION

Total	8,304

SCABIES

Number inspected	484
Number affected	None

BRUCELLOSIS

Number blood samples tested in laboratory	38,149
Positive reactors	1,317
Percentage positive reactors	3.7
Suspicious reactors	2,492
Percentage suspicious reactors	6.5
Number blood samples tested in field	11,562
Number positive reactors	371
Percentage positive reactors	3.2
Number suspicious reactors	370
Percentage suspicious reactors	3.2
Number calves officially vaccinated	46,158

MASTITIS

Number clinically inspected	2,718
Number cases	1,019
Number field laboratory Hotis tests	4,720
Number positive to streptococci	369
Percentage infected with streptococci	7.8
Number positive to staphylococci	402
Percentage infected with staphylococci	8.5

URINARY CALCULI

Number inspected	3,641
Number cases	91

BACILLARY ICTEROHEMOGLOBINURIA

(Red-water)

Number inspected	618
Number cases	28
Number vaccinated	7,201

ACETONEMIA

Number inspected	79
Number cases	18

BLACKLEG

Number inspected	1,244
Number cases	64
Number vaccinated	993

ANAPLASMOSIS

Number inspected	609
Number suspected cases	45
Number blood smears taken	45
Number blood smears positive	16
Number samples taken for complement-fixation test	296
Number suspicious	9
Number positive samples	7

PULMONARY EMPHYSEMA	
Number inspected	240
Number cases	33
ACTINOMYCOSIS	
Number inspected	2210
Number cases	186
EPITHELIOMA (Cancer-eye)	
Number inspected	919
Number cases	24
COCCIDIOSIS	
Number inspected	12,305
Number cases	2,425
MALIGNANT HEAD CATARRH	
Number inspected	150
Number cases	1
DIPHTHERIA	
Number inspected	1,212
Number cases	134
PODODERMATITIS	
Number inspected	4,551
Number cases	308
HEMORRHAGIC SEPTICEMIA & PNEUMONIA	
Number inspected	16,425
Number cases	1,310
Number vaccinated	1,808
JOHNE'S DISEASE	
Number tested	5
Number positive	None
Number suspicious	1
INFECTIOUS KERATITIS	
Number inspected	1,723
Number cases	203
PEDICULOSIS (lice)	
Number inspected	920
Number cases	62
MISCELLANEOUS CATTLE INSPECTIONS	
Cattle inspected for various other diseases	172,134
Number of miscellaneous diseases	1,744
INSPECTIONS FOR INTERSTATE SHIPMENT	
Number inspected	257,118
Number diseased	None

S H E E P

FOOT-ROT

Number inspected	74,701
Approximate number cases	421

CONTAGIOUS ECTHYMA

Number inspected	1,837
Number cases	372

COCCIDIOSIS

Number inspected	9,500
Number cases	1,104

VIBRIONIC ABORTION

Number inspected	2,000
Number cases	105

LIP-AND-LEG ULCERATION

Number inspected	22,100
Number cases	2,133

ENTEROTOXEMIA

Number inspected	18,814
Number cases	299
Number vaccinated	2,275

SCABIES AND MISCELLANEOUS DISEASES

Number inspected	109,743
Number affected with scabies	None
Number affected with other miscellaneous diseases	1,668

IMPORTATION INSPECTIONS *

Number inspected and quarantined	124,295
Number dipped for exposure to scabies	13,165
Number affected with scabies	None
Reinspection of imported sheep	60,742

INSPECTIONS FOR INTERSTATE SHIPMENTS

Number inspected	464,198

SWINE

Number inspected for various diseases	10,783
Number premises infected with hog cholera	2
Inspected for sarcoptic mange	45
Number cases	45
Inspected for interstate shipment	170
Inspected for erysipelas	1,043
Number cases	126
Number blood tested for brucellosis	7
Number positive reactors	None

POULTRY

Number inspected	50,110
Number tested for pullorum by State pullorum testers and testing agents	70,000

DOGS

Inspected for various diseases	2
Cases of rabies	None
Inspected for interstate shipment	809

GOATS

Number inspected for various diseases including brucellosis	23
Number reactors	None
Number inspected for interstate shipment	96

CATS

Inspected for interstate shipment	19

GRAND TOTALS

Total animals inspected and tested	1,534,329
Total fowls inspected and tested	120,110
Total animals and fowls inspected	1,654,439

* includes contact native sheep and one or more reinspections.

MILES TRAVELED BY DISTRICT DEPUTIES

State-owned autos	98,757
Personal autos	202,376

MILES TRAVELED BY RESIDENT DEPUTIES AND LAY INSPECTORS

State-owned autos	14,781
Personal autos	102,130
TOTAL MILES TRAVELED:	418,045

RECAPITULATION OF IMPORTATIONS
1950

STATE	HEALTH CERTIFICATES	TEST CHARTS	HORSES	CATTLE H.C.	CATTLE T.C.	SHEEP	SWINE	DOGS.	MIS.
Alaska	6							4	2
Canada	334	6	360	16525	173	20399	2	1	
Arizona	14		1581					1	
Arkansas	2		2					2	
California	50		6	607		190		35	3
Colorado	138	18	12	8313	80	1871	8	11	1
Florida	7		9	1				6	5
Georgia	1			1				1	
Idaho	229	1	58	11036	1	11062	336	30	
Illinois	29	2		59	2	1	10	10	1
Indiana	5	1	1	1				3	
Iowa	35	7	1	72	32		3	31	1
Kansas	20	6	1	954	9	1966		9	
Kentucky	1							1	
Louisiana	5			410					
Massachusetts	3							3	
Maryland	1						1		
Michigan	4							5	
Minnesota	47	17	20	126	111	1	4	38	
Missouri	17			3			1	16	
Mississippi	2							2	
Nebraska	89	20		3176	70	825	4	52	1
Nevada	8		4	88				6	
New Jersey	1			1					
New Mexico	45	1	3	3761	1	1037			
New York		2			3				
North Dakota	293	32	9	9686	134	3615	156	20	1
Ohio	8							8	
Oklahoma	8			35				12	
Oregon	250	1		1120	19	3389	1	38	1298
South Dakota	92	2	35	2639	31	12586	439	5	
Texas	136	2	26	27512	2	1785		163	2
Utah	33	2	5	697	6	727		18	50
Vermont	11			1					
Washington	312	12	59	5558	51	59963	18	179	1
Wisconsin	17	28		22	341	135		12	
Wyoming	259	45	70	4317	135	12548	840	29	
Total for 1950-	2511	205	2203	97221	1202	132300	1873	747	1366
Total for 1949-	1786	410	1081	38332	4762	112538	883	810	11
GRAND TOTAL FOR BIENNIUM	4297	615	3284	135553	5964	244838	2756	1557	1377